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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,367

11/15/2005

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EXAMINER

TAKEUCHI, YOSHITOSHI

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,367	Applicant(s) YAMAGUCHI ET AL.	
	Examiner YOSHITOSHI TAKEUCHI	Art Unit 4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,7-22 is/are pending in the application.
4a) Of the above claim(s) 10-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1,5,7-9,21 and 22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4 June 2008</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restriction

1. Regarding the **restriction** requirement, the inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Claim 1 is made obvious over Sugimoto et al (US 5,429,846) in view of Miyazaki et al (US 6,599,463). Sugimoto teaches a ceramic slurry including a ceramic powder, a binder resin, a plasticizer and solvent (column 2, lines 20-29), wherein said binder resin contains a polyacetal resin (polyvinyl butyl resin) with a polymerization degree of 1700 and a butyralation degree of 65 mol% (column 17, lines 52-57), the use of 8 or 9 parts of an acetal resin to 100 parts of ceramic powder (column 13, lines 45-46; column 15, lines 31-32).

Sugimoto teaches that the preferable organic solvent should have functional groups that enhance the affinity with the ceramic oxide (column 6, lines 3-5), where the solvent can be a single solvent or a mixture of solvents (column 6, lines 10-11). While Sugimoto does not specifically teach the solvent being at least one of terpeneol, dihydroterpineol, terpinyl acetate, dihydroterpinyl acetate and 4-(1'-acetoxy-1'-) cyclohexanol acetate, Miyazaki teaches the use of terpeneol as an organic solvent (Column 11, line 27) for use with ceramic pastes (abstract). As a result, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a solvent such as terpeneol in the invention of Sugimoto, since terpeneol was known to be a solvent used with ceramics.

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Accordingly, the special technical feature linking the inventions, the electrode level difference absorbing print paste, does not provide a contribution over the prior art, and no single general inventive concept exists. Therefore, restriction is appropriate.

Applicants have made no argument that the cited references do not disclose the special technical feature or that the asserted feature is not a special technical feature.

The restriction requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 5, 7, 8 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al (US 5,429,846) in view of Miyazaki et al (US 6,599,463). Sugimoto teaches a ceramic slurry including a ceramic powder, a binder resin, a plasticizer and solvent (column 2, lines 20-29), wherein said binder resin contains a polyacetal resin (polyvinyl butyl resin) with a polymerization degree of 1700 and a butyralation degree of 65 mol% (column 17, lines 52-57), the use of 8 or 9 parts of an acetal resin to 100 parts of ceramic powder (column 13, lines 45-46; column 15, lines 31-32).

Sugimoto teaches that the preferable organic solvent should have functional groups that enhance the affinity with the ceramic oxide (column 6, lines 3-5), where the solvent can be a single solvent or a mixture of solvents (column 6, lines 10-11). While Sugimoto does not specifically teach the solvent being at least one of terpineol, dihydroterpineol, terpinyl acetate, dihydroterpinyl acetate and 4-(1'-acetoxy-1'-) cyclohexanol acetate, Miyazaki teaches the use of terpineol as an organic solvent (Column 11, line 27) for use with ceramic pastes (abstract). As a result, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a solvent such as terpineol in the invention of Sugimoto, since terpineol was known to be a solvent used with ceramics.

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Sugimoto teaches the use of solvent in the ratio of 100 to 1,000 parts by weight to 100 parts by weight of ceramic powder (e.g. column 2, lines 31-32, 38-39), but does not teach a ratio of solvent of 20 to 80 parts by weight to 100 parts by weight of the ceramic powder. However, Miyazaki teaches a ceramic slurry that uses 35 parts by weight to 100 parts by weight of ceramic powder. (Column 14, lines 63-43 and column 15, line 2). By using less solvent, less drying time is required and uniformity of the film surface can be controlled. It would have been obvious to one having ordinary skill in the art at the time of the invention to use less solvent to reduce the drying time and to improve the uniformity of the film surface.

Sugimoto teaches a ceramic slurry where the ceramic powder consists of 0.5 to 48 wt% of the entire slurry, where the ratio of solvent by weight to ceramic powder by weight is 1,000:100 to 100:100 (C_f 30 to 55 wt%, where the ratio of solvent by weight to ceramic powder by weight is 80:100 to 20:100). It would have been obvious to one having ordinary skill in the art at the time of the invention to have selected the overlapping portion of the ranges disclosed by the reference, for similar ratios of solvent to ceramic powder, because overlapping ranges have been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

- a. Regarding claim 5, Sugimoto teaches viscosities within the range of 20 to 270 centipoises, but does not teach the claimed viscosity of 4 to 30 Pa-s at a shear rate of 8 [1/s]. However, Sugimoto teaches that the viscosity should be adjusted according to its intended use. (Column 1, lines 46-59). “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456 (CCPA 1955). In this case, Sugimoto does not specify the claimed viscosity of 4 to 30 Pa-s at a shear rate of 8 [1/s],

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but it does describe the general conditions of the claim, namely viscosities within the range of 20 to 270 centipoises range and also that the viscosity should be adjusted according to its intended use. It would not be inventive to discover the workable ranges by routine experimentation of the invention taught by Sugimoto.

b. Regarding claims **7** and **21**, Sugimoto does not teach a ceramic slurry that contains at least one of phthalate ester, dibutyl phthalate (DBP), dioctyl phthalate (DOP), benzylbutyl phthalate (BBP), butyl butylene glycol (BPBG), adipic acid ester, dioctyl adipic acid (DOA), sebacic acid ester, or sebacic dibutyl as a plasticizer. However, Miyazaki teaches the use of a phthalate ester (dioctyl phthalate) as a plasticizer. (Column 15, lines 48-49) It would have been obvious to one having ordinary skill in the art at the time of the invention to use a plasticizer, such as dioctyl phthalate, in order to increase the flowability of the ceramic and reduce waste resulting from delamination or microcracking.

c. Regarding claim **8**, Sugimoto teaches a ceramic slurry, but does not teach one where the plasticizer contained is 20 to 200 parts by weight with respect to 100 parts by weight of a binder resin. However, Miyazaki teaches the use of dioctyl phthalate as a plasticizer in the ratio of 3 parts by weight to 7 parts by weight of polyvinyl butyral. (Column 15, lines 48-50). It would have been obvious to one having ordinary skill in the art at the time of the invention to have selected the range of plasticizer disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

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6. Claims **9** and **22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al (US 5,429,846), in view of Miyazaki et al (US 6,599,463) and further in view of Suzuki et al (JP 2002313672). Sugimoto teaches a print paste but does not teach one using at least one of a hygroscopic polymer, cation based surfactant (amine based surfactant) and amphoteric surfactant as an antistatic agent. However, Suzuki teaches that static electricity becomes a strong influence in exfoliating the ceramic green sheet from the base material, especially for sheets less than 3 microns thick. (Detailed Description section, paragraph 0018). Suzuki teaches using an antistatic agent such as trimethylammonium salt (Detailed Description section, paragraph 0034) to prevent damage to a ceramic green sheet, which is less than 3 microns thick, during exfoliation from a base material. (Detailed Description section, paragraph 0018). It would have been obvious to one having ordinary skill in the art at the time of the invention to use an antistatic agent in print paste sheets that are less than 3 microns thick to reduce defects caused during exfoliation from the base material.

Response to Arguments

7. Regarding the **reference** submitted, the examiner considered and is returning a copy of the September 30, 2005 Information Disclosure Statement acknowledging consideration of reference 4.

8. Because of the amendments to claims 7 and 9, the rejections under **35 U.S.C. 112 second paragraph** are withdrawn.

9. Because of the amendment to claim 1 and the cancellation of claim 2, the **35 U.S.C. 102** rejections are withdrawn.

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10. Regarding the rejections under **35 U.S.C. 103**, please see the responses below.

a. In response to applicant's argument that there is no suggestion to combine the Sugimoto and Miyazaki references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347 (Fed. Cir. 1992). In this case, Sugimoto teaches that the preferable organic solvent should have functional groups that enhance the affinity with the ceramic oxide (column 6, lines 3-5), where the solvent can be a single solvent or a mixture of solvents (column 6, lines 10-11). In addition, Miyazaki teaches the use of terpineol as an organic solvent (Column 11, line 27) for use with ceramic pastes (abstract). As a result, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a solvent such as terpineol in the invention of Sugimoto, since terpineol was known to be a solvent used with ceramics.

b. In addition, the applicant's reason for using terpineol as a solvent for ceramic powders need not be the same reason that that the prior art suggests using a terpineol as a solvent for ceramic powders.

c. As a result, the examiner finds the applicant's first argument against combining the Sugimoto and Miyazaki references to be unpersuasive.

d. Secondly, the applicant argues that the combined references would not have produced the claimed invention because claim 1 requires the solvent to 20 to 80 parts by

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weight with respect to 100 parts by weight of the *powder*. However, Miyazaki teaches a ceramic slurry that uses 35 parts by weight to 100 parts by weight of ceramic *powder* (column 14, lines 63-43 and column 15, line 2, emphasis added), which falls squarely within the claimed range of the instant invention. By using less solvent, less drying time is required and uniformity of the film surface can be controlled. It would have been obvious to one having ordinary skill in the art at the time of the invention to use less solvent to reduce the drying time and to improve the uniformity of the film surface.

e. The examiner finds the applicant's second argument against combining the Sugimoto and Miyazaki references to be unpersuasive.

f. In response to applicant's argument that the combined teachings of Sugimoto, Miyazaki and Suzuki would not have rendered claim 1 of the instant invention obvious, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347 (Fed. Cir. 1992).

In this case, Suzuki teaches a motivation for using an antistatic agent, that "static electricity becomes a strong influence in exfoliating the ceramic green sheet from the base material," and Suzuki also teaches a solution to said problem, "using an antistatic agent such as trimethyl ammonium salt...to prevent damage to a ceramic green sheet, Which is less than 3 microns thick, during exfoliation from a base material." As a result,

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Suzuki teaches a motivation to include a trimethyl ammonium salt in an invention taught by Miyazaki and Suzuki.

g. The examiner finds the applicant's argument against combining the Sugimoto, Miyazaki and Suzuki references to be unpersuasive.

11. Regarding the request for **rejoinder**, while non-elected product claims that require all the limitations of an allowable product claim should be rejoined, because all elected claims are rejected, a rejoinder of non-elected claims would not be appropriate.

12. Because of the reasons given above, the rejections stand and the office Action is made FINAL.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yoshitoshi Takeuchi/

YT

October 14, 2008

/Melvin C. Mayes/

Supervisory Patent Examiner, Art Unit 1793